



Proposed Plan for Richardson Flat Tailings Site Park City, Utah



1080940 - R8 SDMS

Introduction

This Proposed Plan identifies the alternatives for cleaning up the tailings impoundment at the Richardson Flat Tailings (RFT) Site (Site). The impoundment is associated with historical mining activities that were performed throughout the Silver Creek Watershed.

This proposed plan describes the Cleanup Alternative preferred by EPA and its partners, and summarizes the clean up alternatives evaluated for use at the Site. This document is issued by the United States Environmental Protection Agency, Region 8 (EPA), and the Utah Department of Environmental Quality (UDEQ). EPA, in partnership with UDEQ, is the agency responsible for regulating and overseeing the cleanup process, and will select a final remedy for the Site after reviewing and considering all information submitted during the 30-day public comment period. EPA, in cooperation with UDEQ, may modify the preferred alternative or select other response actions presented in this plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives presented in this Proposed Plan.

The preferred alternative for the RFT site includes

- Improving containment of the tailings by augmenting the soil cover that is already in place on top of the main impoundment;
- Reinforcing the RFT embankment with a wedge buttress, adding support to the main impoundment;
- Placing excavated tailings from areas just outside of the impoundment and from the nearby wetlands area within the impoundment;
- Using institutional controls to protect the soil cover and prevent future ground-water use.
- Placing mine waste from the Empire Canyon removal action within the main impoundment

We want to hear from you!

Opportunities for Public Involvement

PUBLIC COMMENT PERIOD:

The public comment period is from September 5, 2004 through October 4, 2004. Upon timely request, the comment period can be extended. Such a request must be submitted in writing and postmarked no later than September 14, 2004 to Jim Christiansen at the address below

PUBLIC MEETING:

Tuesday, September 28 from 5:00 p.m. to 8:00 p.m. at the Santy Auditorium, Library & Education Center, 1255 Park Avenue, 3rd Floor, Park City, Utah 84060.

Send comments to:

Jim Christiansen EPR-SR
999 18th Street, Suite 300
Denver, CO 80202

Those who are interested in more information on the proposed remedy for the Site may also review the Remedial Investigation Report (RI) and the Focused Feasibility Study (FFS), which are found in the Administrative Record (AR- the location of the AR is found on page A-8).

Site Background

The Site is located 1.5 miles northeast of Park City, Utah. It is part of a 650-acre property owned by United Park City Mines Company (UPCM). The RFT Site is a tailings impoundment that covers 160 acres in the northwest corner of the property, a small portion of the much larger Upper Silver Creek Watershed. Silver Creek is the primary surface water source found in the area and is fed by run off from three major drainages in the watershed found west of Park City including Ontario Canyon, Empire Canyon and Deer Valley.

Historic mining activities in the canyons left behind several active Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) sites, including Empire Canyon, Prospector Park, Silver Creek Tailings and Silver Maple Claims. Presently, each of these sites impacts Silver Creek in some way (Figure 1). Because of the volume of mining activity throughout the district and the dynamics of the watershed, it is difficult to target any one site as the main contributor of heavy metals affecting Silver Creek, soils, and sediments within the watershed. EPA's remedial goal for the watershed is to clean up the surrounding sites, including the Site, thereby eliminating current and future hazards to human health and the environment.

Site History

When UPCM was formed in 1953, the Site was already being used as an impoundment for mine tailings. In 1970, with renewed mining activity in the area, Park City Ventures (PCV) entered into a lease agreement with UPCM. This agreement allowed PCV to deposit additional mine tailings at the Site. During PCV's use of the Site about 400,000 tons of tailings were deposited at the Site through a slurry pipeline that originated at its mill facility, creating a steep, cone-like structure in the middle of the impoundment. PCV also constructed an earthen embankment along the western edge and constructed dikes along the southern and eastern edges of the impoundment, thereby creating a closed basin that contained the tailings. Additionally, diversion ditches were built by PCV to capture and divert surface water. These operations shaped the topography of the impoundment, which still exists today.

In 1999, EPA, UDEQ, UPCM, Park City Municipal Corporation, and other stakeholders formed the Upper Silver Creek Watershed Stakeholder's Group (USCWSG). This community-based organization was formed to help EPA collaboratively address Superfund-related environmental issues in the Park City area, including the RFT Site. Early in the USCWSG's history, UPCM and EPA agreed to address the Site as a "National Priority List (NPL) equivalent" site, using the same process for investigation and cleanup that is required for a NPL

Site (the NPL is a list of contaminated sites across the nation, requiring investigation and remediation). The stakeholder group has met regularly for the past five years, helping to move this investigation and cleanup forward.

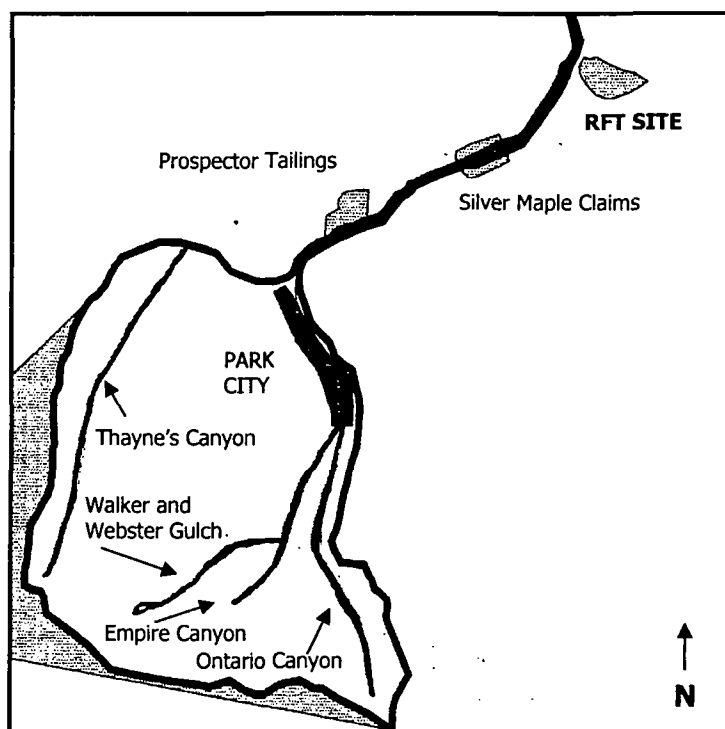


Figure 1: Geographic location of Richardson Flats Tailings Site within the Silver Creek Watershed

Site Investigations

In 2004, UPCM completed a Remedial Investigation (RI) of the Site through an agreement with the EPA. This study identified site characteristics and the types, quantities and locations of contaminants found at the Site. The RI showed that the contamination within the Site consists of heavy metals such as lead, arsenic, zinc and cadmium from the mine tailings deposited at the Site over time. The RI showed that there are impacts from heavy metals associated with the tailings impoundment to the soils, sediments and surface waters that make up the Site. The areas of the Site that contain tailings or contaminated surface water are described in the next section. The FFS, completed in tandem with the RI, was used to identify and evaluate the possible remedial alternatives that would address the risks and contaminants identified in the RI.

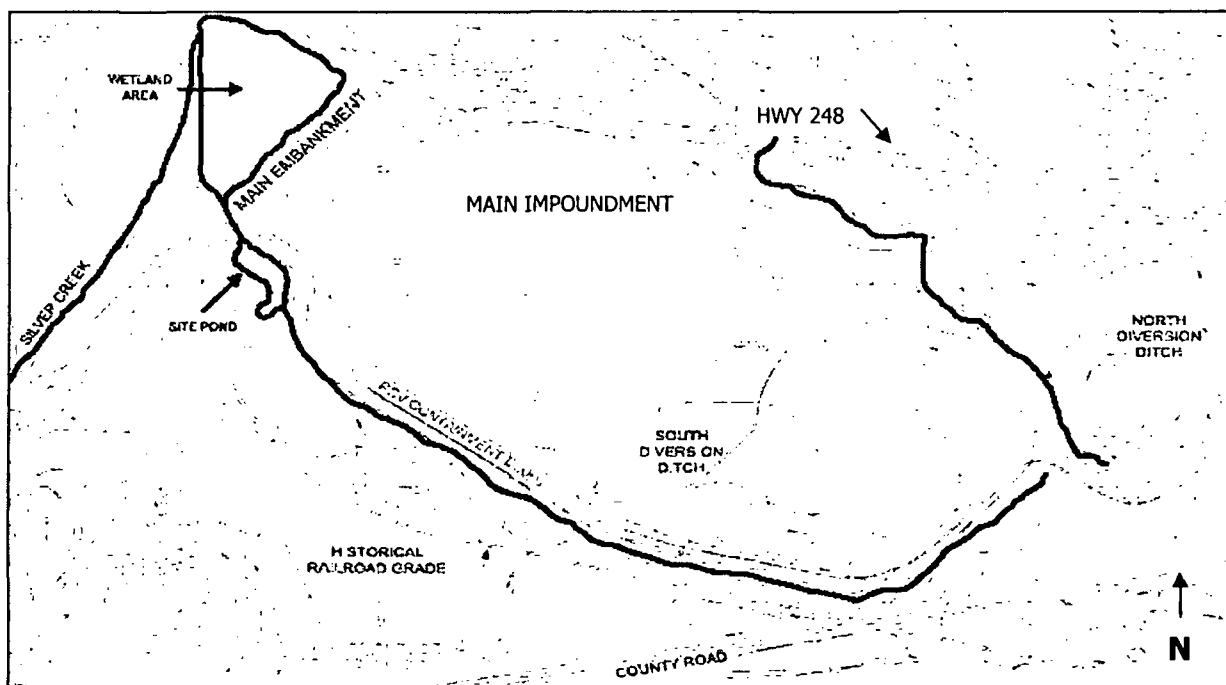


Figure 2: Physical characteristics of the RFT Site, including the main impoundment, diversion ditches, the site pond, the wetlands area and Silver Creek.

Site Characteristics

The physical characteristics of the Site can be seen in Figure 2.

- The majority of the tailings at the Site are contained in the impoundment basin, with a large earth embankment in place along the western edge of the Site.
- A series of man-made dikes contain the tailings along the southern and eastern edge of the impoundment.
- Additional tailings materials are present outside and to the south of the current impoundment area. During historic operations of the tailings pond, tailings accumulated in three naturally low-lying areas adjacent to the impoundment. Even though UPCM covered these off-impoundment tailings with soil, the cover is thin or absent in some locations, leaving some tailings exposed.
- A diversion ditch system borders the north, south, and east sides of the impoundment to prevent surface water runoff from surrounding areas from entering the impoundment.
- There is a wetlands area just below the main embankment. Silver Creek surface water and water from the south diversion ditch mix in this area before the flow returns to Silver Creek.

Scope and Role of the Remedial Action

The Richardson Flat Tailings Site is one of several historic mining sites in the Upper Silver Creek Watershed. Past and present impacts to surface water and sediments in Silver Creek result from the cumulative contributions from mining activities over decades. For this reason, EPA has sought to investigate and remediate the Upper Silver Creek Watershed as a whole, rather than trying to investigate each site separately. This ensures that remedies selected for the individual sites are complementary to each other and work toward the goal of cleaning up the entire watershed.

The Site is different from the other sites in the Park City area in that it is proposed for listing on the NPL. As a result, certain legal and cleanup processes must be followed for RFT. EPA will incorporate comments received during the public comment period for this Proposed Plan into a Record of Decision (ROD), which describes the selected remedy. This will allow the EPA and UPCM to enter into a Consent Decree (CD), which will hold UPCM responsible for planning, funding and conducting remediation of the Site. This Proposed Plan and the ROD for the Site address

only the remedial actions necessary and potential impacts specific to Richardson Flat, but it is part of a broader strategy to clean up the entire Silver Creek Watershed in a consistent, efficient manner.

The preferred remedial alternative will ensure the integrity of the soil cover, reinforce the tailings embankment, and protect surface and ground waters from additional contamination by containing the waste, thereby protecting against potential future risks. Further, institutional controls will minimize future human contact with contamination in any of the site media.

Summary of Site Risks

As part of the RI, a baseline human health and ecological risk assessment were performed at the Site to determine if risks to human health and the environment were sufficient to warrant remedial action. The EPA and UDEQ assessed potential impacts to the public and the environment from the tailings associated with the Site. The assessment indicated that a remedy is necessary to make the site safe for use by recreational visitors. Additionally, the ecological risk assessment determined that animals at the site could be harmed by eating, inhaling or being in direct contact with soil, sediment or water containing metals contamination at the site.

Human Health Risks

The Human Health Risk Assessment (HHRA) was based on sampling results from the site. The purpose of the HHRA was to evaluate the potential for adverse human health effects to occur from exposure to the contaminants of concern, arsenic and lead, at the Site.

The HHRA concluded that if the necessary cleanup action is not taken, or if the soil cover that currently exists on the impoundment is disturbed, there is a risk to future recreational users at the Site because of lead and arsenic present in the tailings. Recreational uses of the Site could include hiking, biking or picnicking. Remedial actions at the Site will focus on minimizing risk of exposure for recreational users.

Ecological Risks

The Ecological Risk Assessment (ERA) evaluated the potential threats to ecological receptors (plants and animals) in and around the Site from exposure to contaminants. The ERA concluded that there are several ways that plants and animals are potentially exposed to metals at the Site. The chart below describes the conclusions of the ERA.

Media	Pathway	Organism	Contaminant
Surface water	Direct contact	Aquatic (fish)	cadmium zinc
Sediment	Direct contact	Aquatic bugs, waterfowl	cadmium, copper, mercury, zinc, lead
Soil/tailings	Direct contact	Plants, insects	aluminum, lead, mercury, zinc

Remedial Action Objectives

The cleanup alternatives presented in this plan will achieve the following results:

- Reduce risks to wildlife receptors in the wetland area and south diversion ditch
- Ensure that recreational users, including children, are protected from exposure to lead and arsenic in soils
- Ensure that surface water discharged from the Site meets applicable Utah water quality standards
- Eliminate the possibility of future ground-water use and withdrawal at the Site
- Allow for a variety of future recreational uses.
- Eliminate the risk of catastrophic failure of the tailings impoundment
- Allow for future disposal of mine tailings from the Park City area within the tailings impoundment
- Minimize post-cleanup disturbance of tailings and contaminated soil. Provide controls for ensuring that any necessary disturbance is controlled

Summary of Alternatives

In the FFS conducted by UPCM, four specific alternatives for remedial action, as well as a No Action alternative, were analyzed in detail. EPA's preferred alternative is Alternative 3. However, any one of these alternatives may be implemented as the preferred alternative based on public comment; therefore, the public is encouraged to comment on all alternatives described in Table 1.

Alternative	Description	Major components
1. No Action	CERCLA and the NCP require that the EPA evaluate the consequences of taking no action at the Site.	None
2. Soil Cover, Institutional Controls and Wedge Buttress	<ul style="list-style-type: none"> The depth of cover over tailings in the Study Area is increased Institutional controls to manage human contact with Site materials are implemented A wedge buttress is added to a portion of the main embankment. The South Diversion Ditch and wetland areas will be left undisturbed. 	<ul style="list-style-type: none"> All tailings are left in current location Existing soil cover is augmented to achieve a depth of at least 18 inches of soil above tailings both inside and outside the impoundment Embankment is fortified to prevent catastrophic failure Institutional controls (easements and land use restrictions) to protect soil cover and prevent ground water use Ongoing surface water monitoring
3. Source Removal, Soil Cover and Wedge Buttress	<ul style="list-style-type: none"> Source removal and covering of tailings located outside of the impoundment Clean soil is placed over the tailings impoundment A wedge buttress is installed Contaminated sediments in the diversion ditch are covered Contaminated sediments in the wetland are removed Future land and groundwater use is restricted 	<ul style="list-style-type: none"> Includes all components of Alternative 2, except: Tailings in critical areas outside the impoundment are excavated and moved inside the impoundment Sediments in diversion ditch are covered with clean gravel Contaminated sediments and soils in the wetland below the embankment are excavated and material is placed within the impoundment Mine waste from the Empire Canyon removal action may be placed within the main impoundment
4. Excavation, Treatment and Offsite Disposal	Contaminated material from the impoundment and from an area south of the diversion ditch is excavated, stabilized on-site, and disposed of in a non-hazardous waste (C&D) or Subtitle C hazardous waste landfill. Once treatment and disposal processes are complete reclamation would occur by grading the area, applying six inches of topsoil and seeding the new soil with a native mix.	<ul style="list-style-type: none"> All tailings are excavated Tailings treated on-site (including those brought to RFT from Empire Canyon) through stabilization process to limit release of metals Tailings disposed of at off-site landfill
5. Excavation, Treatment and Onsite Disposal	Same as Alternative 4, except: The treated materials would be disposed of in a repository space within the impoundment. Upon completion of treatment and disposal activities the impoundment would be reclaimed. The site will be graded to prevent surface water accumulation, thus reducing infiltration. Following remedial activities, 18 inches of soil will be applied, including 12 inches of a low permeability soil and 6 inches of topsoil. The topsoil will be seeded with a native seed mix.	<ul style="list-style-type: none"> All tailings are excavated Tailings treated on-site (including Empire Canyon tailings) through stabilization process to limit release of metals Tailings replaced into impoundment and covered with 18 inches of soil Institutional controls (easements and land use restrictions) to protect soil cover and prevent ground water use Ongoing surface water monitoring

Evaluation of Alternatives

Nine criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. This section of the Proposed Plan describes the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below.

1. Overall Protection of Human Health and the Environment

The cleanup plan must provide adequate protection by eliminating, reducing, or controlling unacceptable risks.

This criterion addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled.

Alternatives 1 and 2 do not provide adequate protection of human health and the environment. Neither alternative addresses risks posed by contaminated sediments in the diversion ditch and wetland areas. Alternative 1 also does not improve physical conditions at the Site, making future releases and exposures likely.

Alternatives 3, 4, and 5 all provide adequate protection of human health and the environment. Alternative 3 addresses risks posed by contaminated sediments in the diversion ditch and wetland areas through a combination of source removal and containment. Alternatives 4 and 5 provide additional protectiveness through treatment of contaminated wastes and soils. Alternatives 3, 4, and 5 also improve physical conditions at the site, minimizing or eliminating the potential for future releases. Alternative 3 accomplishes this with a wedge buttress, soil cover, and institutional controls to better contain the tailings. Alternatives 4 and 5 accomplish this primarily through treatment of contaminated wastes and soils.

2. Compliance with ARARs

It is required under CERCLA that remedial actions must attain (or waive) Federal and State applicable or relevant and appropriate requirements (ARARs) of environmental laws during and upon completion of the remedial action.

All alternatives evaluated either meet, or would be designed to meet all ARARs.

3. Long-term Effectiveness and Permanence

This criterion considers the magnitude of public health risk that will remain after each alternative is implemented and the ability to provide protection of human health and the environment over time.

Due to UPCM's prior voluntary efforts, which include covering portions of RFT with top soil, each alternative provides some degree of long-term protection, though Alternatives 1 and 2 do not adequately address all risks posed by the Site. Alternatives 2 and 3 improve upon "no-action" through the use of physical improvements and institutional controls to reduce the risk of potential future releases from the Site, with Alternative 3 providing additional measures that address the risks posed by the diversion ditch and wetlands. However, both these alternatives require on-going institutional controls and monitoring to ensure their long term efficacy. Alternatives 4 and 5 largely eliminate this concern through treatment of all contaminated wastes and soils.

4. Reduction of Toxicity, Mobility, or Volume through Treatment

The Superfund law places a preference on alternatives that include physical or chemical treatment processes to reduce or eliminate the hazardous nature of material, its ability to move in the environment and/or the quantity left after treatment.

Only Alternatives 4 and 5 contain provisions for active treatment. Both alternatives would reduce, though not eliminate, the toxicity and mobility of the contaminants through stabilization treatment technologies in a similar fashion. The technologies considered are proven for mine wastes, but their effectiveness varies from site to

site based upon the physical characteristics of the waste. However, neither alternative would reduce the volume of material required to be managed, which may actually increase slightly due to the addition of necessary treatment chemicals.

5. Short-term Effectiveness

This criterion evaluates the risks posed to the community and workers during construction of each alternative and the time it will take each alternative to achieve protection of human health and the environment.

Each alternative can be implemented safely with proper engineering controls, though the degree of short-term risk varies considerably among the alternatives.

Alternatives 2 and 3 can be completed in a relatively short time period of approximately two to three construction seasons. These alternatives involve only limited on-site earthmoving and any risks would be limited to workers and trespassers. These risks are easily controlled through institution of safe work practices and engineering controls.

Alternatives 4 and 5 would take substantially more time to complete - perhaps in excess of ten years. Both alternatives not only include more earth moving than Alternatives 2 and 3, but both also involve the operation of treatment systems and the use of slightly toxic treatment chemicals. These factors serve to increase the risk to workers. Alternative 4 also involves off-site transportation and disposal, which increases the risk to the community as waste is hauled via the highway. Again, these risks could be managed, though not as easily, or likely as effectively, as those in Alternatives 2 and 3.

6. Implementability

The selected remedy must be technically and administratively feasible, and services and materials needed to implement the remedy must be available.

All of the alternatives, except Alternative 1, involve technology that is relatively basic.

Alternatives 2 and 3 involve only on-site earth moving, and all of the resources are available locally. Alternatives 4 and 5 are somewhat more difficult to implement due to the inclusion of treatment technologies. However, these technologies are well-established and all of the resources necessary for implementation are readily available.

7. Cost

Before selecting a cleanup plan, the agencies must consider the construction and long-term operations and maintenance costs of each alternative.

Total net present value costs for each alternative are listed below. Total cost includes direct and operational and maintenance costs.

Alternative	Total Cost (\$)
1	0
2	2.3 million
3	4.3 million
4	343 million
5	144 million

8. State Acceptance

Indicates whether the State agrees with, opposes, or has no comment on the Preferred Alternative.

UDEQ has been involved in the RI and FS and agrees with EPA on the preferred alternative (#3). However, UDEQ will provide final acceptance of, or comment on, the preferred alternative after considering public comment.

9. Community Acceptance

EPA must consider whether the local community agrees with EPA's analyses and Preferred Alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the Record of Decision for the Site.

Summary of Preferred Alternative

The preferred alternative for cleaning up the RFT Site is Alternative 3. This consists of the following components:

1) Tailings in critical areas outside the impoundment are excavated and moved inside the impoundment; 2) Sediments in the diversion ditch are covered with clean gravel; 3) Contaminated sediments and soils in the wetland below the embankment are excavated and material is placed within the impoundment; 4) Existing soil cover is augmented to achieve a depth of at least 18 inches of soil above tailings both inside and outside the impoundment; 5) The embankment is fortified to prevent catastrophic failure; 6) Institutional Controls (easements and other land use restrictions) are put in place to protect soil cover and prevent ground-water use 7) Ongoing surface water monitoring will take place; 8) Mine waste from the Empire Canyon removal action may be placed within the main impoundment, and incorporated into the remedial action for the Site; and 9) A five year review will be conducted at the site to ensure the components of remedy are still intact.

UDEQ and EPA prefer this alternative because it

- Meets the threshold cleanup criteria laid out in the NCP in that it provides overall protection of human health and the environment, and is in compliance with ARARs.
- Provides long term effectiveness and remedy permanence and allows for future recreational use of the Site.
- Addresses metals contamination by removing source areas outside of the impoundment and contains the tailings in the main impoundment.
- Is easily implemented.
- Is cost effective.
- Is possible to complete cleanup in a time efficient manner.

Interested in More Information?

The **Administrative Record** including all pertinent documents can be found at:
Park City Library
1255 Park Avenue
Park City, Utah 84060

EPA Contacts:

Jim Christiansen, Remedial Project Manager: 303-312-6748
Jennifer Chergo, Community Involvement Coordinator: 303-312-6601

UDEQ Contact:

Mo Slam, Project Manager, 801-536-4178
Dave Allison, Community Involvement Coordinator: 801-536-4479

UPCM Contact:

Kerry Gee, VP, 435-608-0954

The Upper Silver Creek Watershed Group's **website address** is:
<http://www.silvercreekpc.org/>

Glossary

Administrative Record: The body of documents EPA and UDEQ use to form the basis of selection of a remedy.

Applicable or Relevant and Appropriate Requirements (ARAR): Federal and State requirements for cleanup, control, and environmental protection that a selected remedy for a site will meet.

Arsenic: Arsenic is a naturally occurring elemental metal. The main exposure route for lead contaminated soil is eating. Exposure to arsenic may result in skin, liver, bladder and lung cancer. Non-cancer affects due to exposure to arsenic can include thickening of the skin and formations of corns on palms and soles, as well as irritation of the gastrointestinal tract and nausea.

Cap: A remedial technology that addresses exposure by providing a barrier to hazardous materials and prevents seeping of rainwater and snow melt into the waste material using an impermeable layer.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A Federal law passed in 1980 and modified in 1986 and 2001. It set up a program to identify sites where hazardous substances have been, or might be, released into the environment and to ensure they are cleaned up. Most of these sites are abandoned or are no longer active.

Ecological Receptors: Non-human species (plant and animal) that are impacted by site contaminants.

Ecological Risk Assessment (ERA): A study conducted as part of the RI that determines and evaluates risk that site contamination poses to ecological receptors in absence of cleanup.

Human health risk assessment (HHRA): A study conducted as part of the RI that determines and evaluates risk that site contamination poses to human health in the absence of cleanup.

Institutional Controls: A non-engineered or non-constructed mechanism that minimizes potential human exposure to contamination. Some examples of Institutional Controls are easements, building permit restrictions, local health regulations, public awareness and access limitations that are placed on a property to reduce exposure to hazardous material on that property.

CERCLIS: The data base and data management system EPA uses to track activities at sites considered for cleanup under the Comprehensive Environmental Response and Liability Act (CERCLA) (also known as Superfund)

Lead: Lead is a naturally occurring elemental metal. The main exposure route for lead contaminated soil is eating. The adverse affects of lead in adults can include high blood pressure, and an inability to absorb Vitamin D. Young children are more susceptible to lead exposure because they have higher contact rates with soil and dust and absorb lead more readily than adults. Exposure to lead may damage the nervous system in young children. Other affects of exposure to lead in children can include decreased IQ and hand-eye coordination.

National Contingency Plan (NCP): The EPA's regulations governing all cleanups under the Superfund program.

National Priorities List (NPL): EPA's list of the potentially most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response.

Proposed Plan: A document requesting public input on a proposed remedial alternative.

Remedial Investigation (RI): A study conducted to identify the types, amounts, and locations of contamination at a site. It also evaluates possible risk to public health and the environment from exposure to contamination.

Record of Decision: A document that is a consolidated source of information about the site, the remedy selection process, and the selected remedy for a cleanup under CERCLA

Superfund: The common name for the Comprehensive Environmental Response Compensation and Liability Act. The Superfund is a trust fund set up to pay for the clean up of hazardous waste sites throughout the United States.

